AD-A135 547 LINEAR INDUCTIVE ACCELERATOR(U) FOREIGN TECHNOLOGY DIV 1/1
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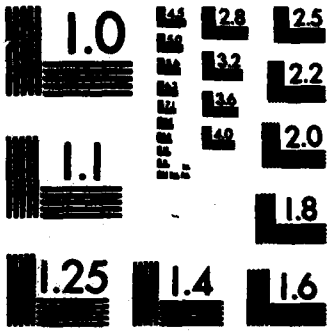

MICROCOPY RESOLUTION TEST CHART
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FOREIGN TECHNOLOGY DIVISION

LINEAR INDUCTIVE ACCELERATOR

by

V. S. Bosamykin, A. I. Gerasimov, A. I. Pavlovskiy

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U. S. BOARD ON GEOGRAPHIC NAMES TRANSLITERATION SYSTEM

Block	Italic	Transliteration	Block	Italic	Transliteration
А а	*А а*	A, a	Р р	*Р р*	R, r
Б б	*Б б*	B, b	С с	*С с*	S, s
В в	*В в*	V, v	Т т	*Т т*	T, t
Г г	*Г г*	G, g	У у	*У у*	U, u
Д д	*Д д*	D, d	Ф ф	*Ф ф*	F, f
Е е	*Е е*	Ye, ye; E, e*	Х х	*Х х*	Kh, kh
Ж ж	*Ж ж*	Zh, zh	Ц ц	*Ц ц*	Ts, ts
З з	*З з*	Z, z	Ч ч	*Ч ч*	Ch, ch
И и	*И и*	I, i	Ш ш	*Ш ш*	Sh, sh
Й й	*Й й*	Y, y	Щ щ	*Щ щ*	Shch, shch
К к	*К к*	K, k	Ъ ъ	*Ъ ъ*	"
Л л	*Л л*	L, l	Ы ы	*Ы ы*	Y, y
М м	*М м*	M, m	Ь ь	*Ь ь*	'
Н н	*Н н*	N, n	Э э	*Э э*	E, e
О о	*О о*	O, o	Ю ю	*Ю ю*	Yu, yu
П п	*П п*	P, p	Я я	*Я я*	Ya, ya

*ye initially, after vowels, and after ъ, ь; e elsewhere.
When written as ё in Russian, transliterate as yё or ё.

RUSSIAN AND ENGLISH TRIGONOMETRIC FUNCTIONS

Russian	English	Russian	English	Russian	English
sin	sin	sh	sinh	arc sh	$\sinh^{-1}$
cos	cos	ch	cosh	arc ch	$\cosh^{-1}$
tg	tan	th	tanh	arc th	$\tanh^{-1}$
ctg	cot	cth	coth	arc cth	$\coth^{-1}$
sec	sec	sch	sech	arc sch	sech^{-1}
cosec	csc	csch	csch	arc csch	csch^{-1}

Russian	English
rot	curl
lg	log

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LINEAR INDUCTIVE ACCELERATOR

V. S. Bosamykin, A. I. Gerasimov, A. I. Pavlovskiy

The known inductive accelerators contain torroidal magnetic coils, an accelerating circuit, and magnetic solenoid focusing lenses.

In these accelerators, the uniformity of the electrical field is determined by the ratio of the length of the accelerating gap of the auxiliary circuit and the radius of the acceleration region.

The proposed accelerator is different because the accelerating system, or part of it, is loaded through a capacitor on a solenoid, which is uniformly distributed throughout the accelerating system and connected to an independent electrical current source.

This design of the system makes it possible to improve the uniformity of the electrical field and increase the longitudinal focusing magnetic field. This is especially important for high-current accelerators.

The figure shows the described linear induction accelerator in the cross section.

The solenoid 1 is connected on one end to grounded plate AB of auxiliary circuit ABCD; it is placed in the accelerating gap AD. The other end of the solenoid is connected to plate CD of the

auxiliary circuit through capacitor 2 and discharger 3.

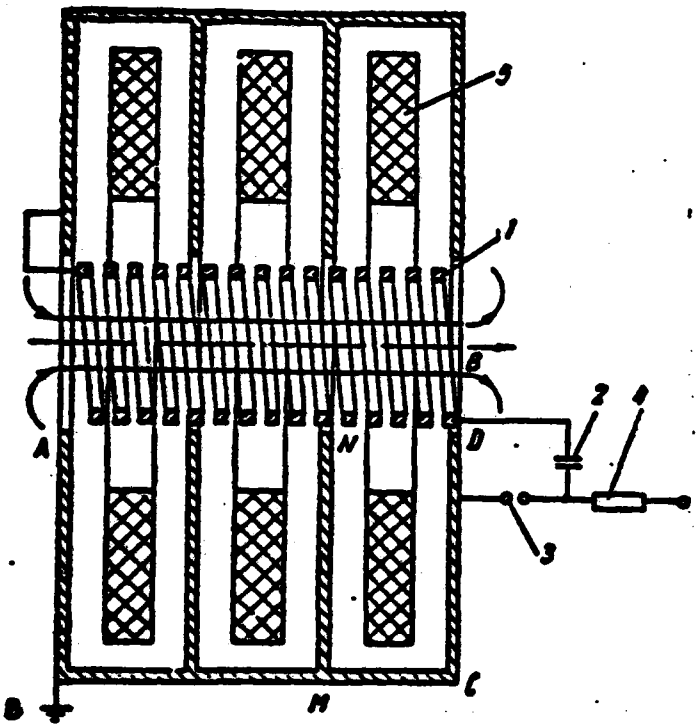

Figure.

The capacitor 2, which is charged through resistor 4, is discharged when discharger 3 operates through a circuit consisting of circuit ABCD and solenoid 1, creating magnetic field $\vec{B}$ inside the solenoid. When the magnetic field in the acceleration region reaches the maximum value, the switches of the primary circuits of the acceleration system operate simultaneously. When the fluxes Φ simultaneously change in each of the magnetic conductors 5, the potential difference $\varepsilon = -n\frac{d\Phi}{dt}$ (n is the number of magnetic conductors) originates in accelerating gap AD. This potential difference is applied to the solenoid if $\frac{1}{\omega C} \ll \omega L$, where L is the inductance of the solenoid, ω is the frequency of the accelerating field, and C is the capacitance of the capacitor.

The correct selection of the parameters of the circuit which creates the magnetic field, in particular, the inductance of the solenoid, makes it possible to make certain that the load of the accelerating system is much smaller than the current flowing through the solenoid from the independent source, which is important for decreasing the perturbations of the longitudinal magnetical field at the time of acceleration. Furthermore, the load current in the solenoid should not appreciably decrease the accelerating difference of potentials.

The potential difference between the solenoid turns and the closest intermediate plates (e.g., MN) of the secondary circuits can

be small (less than the voltage in each primary circuit), since the set of plates of the secondary circuits is a rougher divider of the total accelerating voltage.

The accelerating electrical field penetrates into the acceleration region by charging the interturn capacitances of the solenoid. Therefore, by making the size of the solenoid spacing small compared to the radius of the acceleration region, it is possible to obtain a uniform electrical field in it, with the force lines following those of the longitudinal magnetic field.

These accelerators can be used for obtaining intense beams of charged particles.

Subject of Invention

This invention is a linear induction accelerator which contains inductive magnetic coils, an accelerating system, and focusing coils. It is different because in order to increase the strength of the longitudinal focusing magnetic field and improve the uniformity of the electrical field, the accelerating system or part of it is loaded through a capacitor on a solenoid which is uniformly distributed throughout the accelerating system and connected to an independent electrical current source.

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